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DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371ATTORNEY DOCKET NUMBER
127.003

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

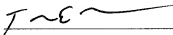
09/701673

INTERNATIONAL APPLICATION NO
PCT/EP98/03355INTERNATIONAL FILING DATE
04 June 1998 (04.06.98)PRIORITY DATE CLAIMED
N/ATITLE OF INVENTION: *Method and Device for Producing a Toothbrush*

APPLICANT(S) FOR DO/EO/US: Carl Schiffer

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
 2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
 3. ☒ This express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371 (b) and PCT Articles 22 and 39(1).
 4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
 5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
 6. ☒ A translation of the International Application into English (35 U.S.C. 371 (c)(2)).
 7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
 8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
 9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
 10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
- Items 11. To 16. below concern document(s) or information included:**
11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. (and references)
 12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
 13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
 14. ☐ A substitute specification.
 15. ☐ A change of power of attorney and/or address letter.
 16. ☐ Other items or information:

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/701673		INTERNATIONAL APPLICATION NO. PCT/EP98/03355		ATTORNEY DOCKET NUMBER 127.003					
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445 (a)(2)) paid to USPTO \$710.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33 (1)-(4) \$100.00 <div style="text-align: right;">ENTER APPROPRIATE BASIC FEE AMOUNT =</div>				CALCULATIONS PTO USE ONLY <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%; text-align: right;">\$ 860.00</td> </tr> <tr> <td></td> <td style="text-align: right;">\$ 0.00</td> </tr> </table>			\$ 860.00		\$ 0.00
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Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).									
Total claims		14 - 20 =		0 X \$18.00					
Independent claims		1 - 3 =		0 X \$80.00					
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+ \$270.00					
TOTAL OF ABOVE CALCULATIONS =				\$ 860.00					
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				\$ 0.00					
SUBTOTAL =				\$ 840.00					
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ 0.00					
TOTAL NATIONAL FEE =				\$ 860.00					
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$ 0.00					
TOTAL FEES ENCLOSED =				\$ 860.00					
				Amount to be: Refunded					
				Charged					
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>860.00</u> to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. <u>50-1170</u> in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>50-1170</u> . A duplicate copy of this sheet is enclosed. NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.									
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> SEND ALL CORRESPONDENCE TO BOYLE FREDRICKSON NEWHOLM STEIN & GRATZ S.C. 250 East Wisconsin Avenue, Suite 1030 Milwaukee, WI 53202-4232 Telephone (414) 225-9755 Facsimile (414) 225-9753 </div> <div style="width: 45%; text-align: right;">  SIGNATURE <u>Timothy E. Newholm</u> NAME <u>34,400</u> November 28, 2000 REGISTRATION NUMBER DATE </div> </div>									

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

National Phase of PCT/EP98/03355

International Filing Date: 4 June 1998

Priority: None

Inventor: Carl Schiffer

Title: *Method and Device for Producing a Toothbrush*

PRELIMINARY AMENDMENT

DO/EO/US
Director of the U.S. Patent
and Trademark Office
Washington, D.C. 20231

Sir:

This Preliminary Amendment is directed to a new U.S. application as identified above.

Please enter this Preliminary Amendment prior to calculating the fees.

Please substitute claim 1 on the Amended Sheet for claim 1 on page 13 of the specification as originally filed and claim 9 on the Amended Sheet for claim 9 on page 14 of the specification as originally filed. The new claims incorporate revisions to the international PCT application which were modified under Article 34.

Please amend the application as follows:

IN THE SPECIFICATION:

Page 1, after the title insert the heading --BACKGROUND OF THE INVENTION--; and subheading --1. Field of the Invention--.

Page 1, between lines 7 and 8, insert the subheading --2. Description of the Related Art--.

Page 3, before line 1, insert the heading --OBJECTS AND SUMMARY OF THE
INVENTION--.

Page 7, between lines 7 and 8, insert the heading --BRIEF DESCRIPTION OF THE
DRAWINGS--.

Page 7, between lines 20 and 21, insert the heading --DETAILED DESCRIPTION OF
THE PREFERRED EMBODIMENTS--.

LIST OF REFERENCES NUMERALS:

Please cancel page 12.

IN THE CLAIMS:

Claim 3, line 1, delete “claim 1 or 2” and insert --claim 1--.

Claim 4, line 1, delete “at least one of the preceding claims” and insert --claim 1--.

Claim 6, line 1, delete “claim 4 or 5” and insert --claim 4--.

Claim 7, line 1, delete “at least one of claims 4 to 6” and insert --claim 4--.

Claim 8, line 1, delete “at least one of claims 4 to 7” and insert --claim 4--.

Claim 9, lines 2 and 3, delete “according to at least one of claims 1 to 8” and insert --
claim 1--.

Claim 11, line 1, delete “claim 9 or 10” and insert -- claim 9 --.

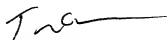
Claim 12, line 1, delete “at least one of claims 9 to 11” and insert -- claim 9 --.

Claim 14, line 1, delete “claim 12 or 13” and insert -- claim 12 --.

REMARKS

This application has been amended to insert headings in the specification, to eliminate the multiple dependencies in the claims, and to incorporate Article 34 Amendments from the corresponding PCT application. Entry of the amendments and early consideration and allowance are respectfully requested.

Respectfully submitted,



Timothy E. Newholm
Registration No. 34,400

Dated: November 28, 2000

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PCT/EP98/03355

Applicant: M + C Schiffer GmbH

Our ref.: PCT 866-092/lem

Date: May 18, 2000

**New patent claims 1 and 9
(together with the originally filed dependent claims)**

1. A method for producing a toothbrush comprising a handle part and a brush head including a plurality of tufts of bristles, wherein plastified material is injected into a plurality of separate mold cavities configured in a joint tool for shaping identical, separated molded bodies,

characterized in

that the individual mold cavities are filled with different components of a plastified material in one injection molding cycle, and that the different components of the plastified material are supplied via separated channels to the separate mold cavities.

9. A device for producing a toothbrush comprising a handle part and a brush head including a plurality of tufts of bristles, in particular according to at least one of claims 1 to 8, comprising an injection molding tool having formed therein a plurality of identical mold cavities,

characterized in

that a plurality of plastifying units (1a; 1b; 1c) are provided, each communicating with different mold cavities of the injection molding tool.

AMENDED SHEET

Method and Device for Producing a Toothbrush

The present invention relates to a method for producing a toothbrush comprising a handle part and a brush head including a plurality of tufts of bristles, in which plastified material is injected into a plurality of mold cavities configured in a joint tool for shaping structural parts with an identical geometry.

For enhancing productivity it is known in the production of toothbrushes that a plurality of mold cavities of an identical shape are simultaneously filled with a plastified material. A plurality of structural parts comprising, for instance, a handle part and a brush head can be produced in each cycle by using so-called multiple tools, thereby enhancing productivity. The tufts of bristles are either connected to the brush head by over-molding in the injection molding tool or, after the structural part has been shaped, they are anchored in bores formed on the brush head to said head by way of the so-called anchoring technique. Toothbrushes produced in this way are normally produced in different colors, having the same technical or design features of one toothbrush type. For each change in color the preceding color must first be fully discharged from the plastifying unit and from the supply channels leading to the individual mold cavities, the new color component being already filled into the inlet portion of the plastifying unit at the same time. Thus, a change in color produces undesired waste because of a mixing of the colors of the preceding color component with the subsequent color component.

Nowadays, toothbrushes are normally delivered by the manufacturer in a ready-for-sale form. The demand is here made that toothbrushes of the same type, but of different coloration or with different stiffness characteristics of the bristle tufts, should be combined in small packaging units to adapt them to the individual requirements of

the user. Such small packaging units must just be removed from a carton in retail trade to be able to offer all variants of a toothbrush type to the customer.

On account of the requirements of the ready-for-sale fabrication, all toothbrushes of one color are first produced by injection molding and stored in the manufacture of toothbrushes of one type having different variants, e.g. a different coloration. Subsequently, the further color designs of the toothbrush type are produced and also stored in sequential order - with acceptance of the above-described drawbacks of a change in color - until the last color variant has been produced by way of injection molding. When the conventional anchoring technique is employed, the provision of bristles, i.e. the mounting of tufts of bristles on the structural part composed of handle part and brush head, will only be carried out after all color variants have been finished. Finally, the toothbrushes of different color variants that have been finished in this way are combined with all color variants in the small packaging units desired by the customers and are packaged to be ready for sale.

The above-described method has the drawback that a considerable number of toothbrushes must be stored temporarily for finally packaging all variants such that they are ready for sale. This prolongs the manufacturing times for preparing ready-for-sale packaging units. Moreover, the structural parts of a different coloration are stored as mass-produced goods so that these must be picked up again individually to be provided with bristles or for ready-for-sale packaging, their position must be detected and they must be oriented to feed the structural parts in a defined manner to the tufting means or the packaging means. This requires additional treatment steps that are expensive. Moreover, the storage of a considerable number of structural parts without bristles or even of finished toothbrushes is capital-intensive.

It is the object of the present invention to provide a method and a device for producing toothbrushes of the above-mentioned type by which variants of toothbrushes of one type can be prepared efficiently and inexpensively for ready-for-sale packaging.

As far as the method is concerned, this object is achieved by a method for producing a toothbrush of the above-mentioned type, which is characterized in that different components of the plastified material are supplied via separate channels to individual mold cavities.

It is possible with the method of the invention to produce toothbrushes of one type in a single tool, i.e. with an identical geometry, but of different components which may e.g. differ with respect to their coloration or their elastic properties. Thus the method of the invention permits the simultaneous production of a multitude of geometrically identically designed toothbrushes and thus offers the advantages of a multiple tool. Since different components of the plastified material are supplied via separate channels to individual mold cavities, different variants of one toothbrush type are produced at the same time. Thus toothbrush variants of one toothbrush type can be produced simultaneously in the tool in accordance with the requirements made on a ready-for-sale packaging, so that there will be no disadvantageous temporary storing of individual variants of one toothbrush type that is time- and cost-intensive. It is e.g. possible with the method of the invention to produce all variants of a toothbrush type in a single tool at the same time. The variants of one toothbrush type produced with the method of the invention can directly be removed from the tool with a handling device and supplied in a defined position to a tufting means or to a packaging means for packaging into ready-for-sale units. Thus a separate handling, detection and orientation of finished toothbrushes that are temporarily stored as mass-produced goods or of structural parts without bristles can be dispensed with. With the method

of the invention variants of toothbrushes can thus be prepared efficiently and inexpensively for ready-for-sale packaging.

According to a preferred development of the present invention, the plastified material is kept in a liquid state in the channels. Thanks to such a measure, it is possible to use the entire material plastified in the plastifying unit of the injection-molding machine for forming injection-molded toothbrush parts.

According to a further preferred development of the present invention several structural parts are shaped with one component. A method for producing a toothbrush with enhanced productivity is thereby created. For each variant of a toothbrush type there are provided several identical mold cavities which are filled with a specific component of the plastified material for shaping the toothbrush part.

According to a further preferred design of the present invention, several basic bodies are shaped in a joint tool in a first molding step and the basic bodies are over-molded in a second molding step. High-quality toothbrushes can thereby be produced. Different components that differ in their material properties can be used for shaping specific functional portions on the structural part. For instance, supports which form the outer surface of the handle part for supporting the hand of a user can be provided on the handle part by way of a flexible component. Moreover, the elastic properties of a neck portion formed between brush head and handle part can be varied not only through the geometrical design, but also, for instance, by selection of the component to be over-molded. Finally, the components to be over-molded may have the same material characteristics as the component used in the first molding step and may just be over-molded for the further color design of the toothbrush part.

As a rule, it should be noted that different "components" just differ with respect to their coloration; otherwise, they have the same material properties. Of course, different "components" in the sense of the present invention may also cover materials having different physical properties, such as hardness, elasticity, adhesion properties, or the like. Different "components" within the meaning of the invention may, however, also differ with respect to their color and with respect to their physical properties.

According to a further preferred design of the present invention, the different components of the plastified material are supplied in the second molding step. If in the first molding step the same component is used for all mold cavities, this will yield an identical basic body for all variants of a toothbrush type with different over-moldings, which may e.g. be provided for forming colored handle surfaces.

According to a particularly preferred development of the present invention, different components of a plastified material are also supplied in the first molding step via separate channels to the mold cavities for shaping the basic body, resulting in a very high variability of toothbrushes of the same toothbrush type.

A method which can be carried out in a particularly economic manner is provided according to a further preferred development of the present invention by the measure that the first and second molding steps are carried out in the same tool. Long transportation paths of the basic body formed in the first molding step are thus not required for over-molding.

The present method of the invention is not limited to carrying out only two successive molding steps. It is also possible to carry out three or more successive molding steps, and it is of course possible to use different components in separate mold

cavities in said molding steps. This results in many possible designs for obtaining different variants of one toothbrush type. For instance, four basic bodies that have been identically shaped in a first molding step can be over-molded in a second molding step with a respective color component. This results in four structural parts with an identically colored basic body and four different over-moldings. In a subsequent molding step, said four structural parts may e.g. be over-molded once again in further mold cavities, of which two are respectively assigned to a plastifying unit, to be then supplied as finished three-component injection-molded parts for ready-for-sale packaging.

According to a further preferred development of the present invention, at least some of the bristle tufts are connected in the second molding step to the basic body by over-molding the tufts of bristles and/or a bristle tuft holding portion particularly formed in the first molding step on the tuft of bristles. With such a design the stiffness characteristics of the tufts of bristles connected by over-molding to the basic body are influenced by the physical properties of the material over-molded in the second molding step. Toothbrushes of one toothbrush type, but with different stiffness properties, can thus be prepared efficiently and inexpensively for ready-for-sale packaging by using components of different physical characteristics in the second molding step for over-molding in individual mold cavities; unless all tufts of bristles are connected in the second molding step by over-molding to the basic body, the remaining tufts of bristles can e.g. be connected to the basic body in a subsequent, third or fourth molding step or also conventionally by way of anchoring following the shaping process.

As far as the device is concerned, the above object is achieved with a device for producing a toothbrush of the above-mentioned type with an injection molding tool in which a plurality of identical mold cavities are formed, the device being characterized

in that different plastifying units are assigned to individual mold cavities. In the different plastifying units, the components are plastified for shaping various variants of a toothbrush type and are injected into the mold cavities via separate channels assigned to the respective mold cavities, so that variants of one toothbrush type can be prepared efficiently and inexpensively for ready-for-sale packaging with the device of the invention.

Further details, advantages and features of the present invention will become apparent from the following description of the drawing, in which:

Fig. 1 is a schematic view of a tool of an embodiment of the device according to the invention;

Fig. 2 is a schematic view of a further tool of a preferred embodiment of the present invention;

Fig. 3 shows the upper part of the tool shown in Fig. 2, in a first valve position; and

Fig. 4 is a view shown in Fig. 3, of a second valve position.

The molding tool shown in Fig. 1 is part of an embodiment of a device for making toothbrushes. Apart from the tool shown in Fig. 1, the device comprises a plurality of plastifying units 1, which are only schematically drawn in Fig. 1. The respective nozzles of the plastifying units 1a, 1b communicate via sprues 2 and manifold runners 3 with mold cavities 4. In the embodiment shown in Fig. 1, eight identical mold cavities are formed in the tool, said eight mold cavities 4 being combined in two groups of four mold cavities 4a; 4b each. The one group of first mold cavities 4a communicates with the corresponding plastifying unit 1a via the manifold runners 3a

and the sprue 2a, whereas the group of second mold cavities 4b are connected via flow channels 2b, 3b to the corresponding plastifying unit 1b.

Different components of a plastified material are prepared in the respective plastifying units 1a, 1b. In the present case, the different components differ in color. In each injection molding cycle, four brush bodies of a first color that consist of a handle part and a brush head are thus produced, as well as four further brush bodies of a second color. The brush bodies may be provided with bristles in two ways: on the one hand, tufts of bristles may be inserted into the injection molding prior to the mold filling operation and connected to the brush body by over-molding. Alternatively, the brush body which comprises recesses for the insertion of tufts of bristles may also be provided with tufts of bristles in a subsequent tufting step.

Fig. 2 shows a further embodiment of a tool. Said tool is an octuple tool for multi-component injection molding. The tool comprises eight first mold cavities 4a that are connected via manifold runners 3a and a sprue to a first, schematically drawn plastifying unit 1a. Said first mold cavities 4a are smaller than the second mold cavities 4b; 4c, whose manifold runners 3 terminate at a valve body 5. The valve body 5, which is circular when viewed from the top, comprises two angled flow channels 6, 7 arranged in point symmetry with the center point of the valve body 5. Furthermore, the valve body comprises a T-shaped manifold 8.

In the position shown in Fig. 2, the angular flow channels 6, 7 communicate via sprues 2 with plastifying units 1b, 1c. Each of the plastifying units 1b, 1c thus communicates with four mold cavities 4b, 4c.

In each injection molding cycle, all mold cavities 4a, 4b, 4c are filled with a molding material. Eight identical basic bodies are molded in the mold cavities 4a from an

identical material component. When the tool is opened, said eight basic bodies are inserted into the mold cavities 4b, 4c that have been demolded or emptied in the meantime. Said mold cavities 4b, 4c are identical with one another, but made larger than the mold cavities 4a. The tool is closed, and a new injection molding cycle is started in which eight basic bodies of the first material component are shaped again and, in addition, four of the basic bodies shaped in the first mold cavity 4a are over-molded with different components in mold cavities 4b, 4c. For instance, the basic bodies received in mold cavities 4b can be over-molded with a first color which has been prepared in the plastifying unit 1b, while in the same injection molding cycle the four basic bodies received in the mold cavities 4c are over-molded with a different component which has been prepared in the plastifying unit 1c. Thus, it is possible with the embodiment of a tool as shown in Fig. 2 to produce eight toothbrushes of one type, i.e. with an identical geometry, in one injection molding cycle at the same time, four toothbrushes thereof being respectively identical. The two variants of toothbrushes produced in this way can be supplied by a handling device directly to a tufting means or, on condition that the tufts of bristles have been anchored to the brush body by over-molding, can directly be packaged in a packaging means to be ready for use. In the illustrated embodiment, two different variants of a toothbrush type are combined in small packaging units in the case of a ready-for-use packaging; in retail trade these have just to be removed for offering all variants of a toothbrush type to a customer. Since several variants of a toothbrush type are simultaneously produced in the injection molding tool, the steps required in the prior art for preparing and combining different variants of a toothbrush type are dispensed with.

Figs. 3 and 4 show different operative positions of the valve body 5. The operative position of the valve body 5 as shown in Fig. 3 corresponds to the position shown in Fig. 2, in which a respective plastifying unit 1b; 1c communicates with four mold cavities 4b; 4c. The T-shaped manifold 8 is connected to sprue 2c by rotating the

valve body 5 by 90° in clockwise direction. Thus all of the eight basic bodies are over-molded with the component prepared in the plastifying unit 1c. Said state is shown in Fig. 4. In this position the sprue 2b is blocked. When the valve body is rotated by 180° from the position shown in Fig. 4, the basic body is over-molded with the material prepared in the plastifying unit 1b in the blocked state of sprue 2c.

Instead of the valve, it is possible to provide any desired shut-off means which, for instance, may also be formed by a plug or a slide. The shut-off means may be operated mechanically, electrically, pneumatically or hydraulically. In a particularly simple design, there is just provided a tool insert which is replaced for changing the components.

When a valve body 5, as is shown in Figs. 2 to 4, is used, it is easily possible to change the output of different variants of toothbrushes of one type. For instance, two different variants can selectively be produced with different colors of the second over-molded component (Fig. 3). If only the production of one variant is desired, the valve body 5 is rotated into the operative position shown in Fig. 4, or into an operative position rotated by 180° with respect to said position. For changing the component, for instance for changing the color or the material of the second component, the material already prepared in a plastifying unit need not be discharged first for preparing a new component in said plastifying unit. A change in color can be accomplished by just rotating the valve body. Since hot runners are used in the illustrated tool, the material will remain flowable in the tool even if it is just offered via the respective plastifying unit, but not injected.

Of course, the valve body shown in Fig. 4 can be varied in any desired manner, for instance, to feed the plastified material from more than three plastifying units in a

selective manner to the respective mold cavities. A valve can e.g. also be provided in an injection molding tool in which just one component is processed (cf. Fig. 1).

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List of Reference Numerals

- | | |
|------|------------------|
| 1 | plastifying unit |
| 2 | sprue |
| 3 | manifold runner |
| 4 | mold cavities |
| 5 | valve body |
| 6, 7 | flow channels |
| 8 | T-manifold |

Patent Claims

1. A method for producing a toothbrush comprising a handle part and a brush head including a plurality of tufts of bristles, wherein plastified material is injected into a plurality of mold cavities configured in a joint tool for shaping structural parts with an identical geometry, **characterized in** that different components of the plastified material are supplied via separate channels to individual mold cavities.
2. The method according to claim 1, **characterized in** that the plastified material is kept in a liquid state in the channels.
3. The method according to claim 1 or 2, **characterized in** that one component is injected into a plurality of mold cavities.
4. The method according to at least one of the preceding claims, **characterized in** that a plurality of basic bodies are shaped in a joint tool in a first molding step, and that the basic bodies are over-molded in a second molding step.
5. The method according to claim 4, **characterized in** that the different components of the plastified material are supplied in the second molding step.
6. The method according to claim 4 or 5, **characterized in** that in the first molding step different components of plastified material are supplied via separate channels to the mold cavities for shaping the basic bodies.
7. The method according to at least one of claims 4 to 6, **characterized in** that the first and second molding steps are carried out in the same tool.

8. The method according to at least one of claims 4 to 7, **characterized in** that at least some of the tufts of bristles are connected in the second molding step to the basic body by over-molding the tufts of bristles and/or a bristle tuft holding portion formed, in particular, in the first molding step on the tuft of bristles.
9. A device for producing a toothbrush comprising a handle part and a brush head including a plurality of tufts of bristles, in particular according to at least one of claims 1 to 8, comprising an injection molding tool having formed therein a plurality of identical mold cavities, **characterized in** that individual mold cavities (4a; 4b; 4c) are assigned to different plastifying units (1a; 1b; 1c).
10. The device according to claim 9, **characterized in** that a plurality of first mold cavities (4a) are provided for shaping basic bodies of an identical geometry and a number of second mold cavities (4b; 4c) corresponding to the number of first mold cavities are provided that are made larger than the first mold cavities (4a).
11. The device according to claim 9 or 10, **characterized in** that different plastifying units (1b; 1c) are assigned to individual ones of the second mold cavities (4b; 4c).
12. The device according to at least one of claims 9 to 11, **characterized in** that there is provided at least one shut-off device (5) by which individual or several mold cavities (4a; 4b) can be brought into flow communication with a plastifying unit (1a; 1b).

13. The device according to claim 12, **characterized in** that different mold cavities can selectively be brought by the shut-off device (5) into flow communication with different plastifying units (1b; 1c) or with a joint plastifying unit (1a; 1b).
14. The device according to claim 12 or 13, **characterized in** that a shut-off device (5) is assigned to mold cavities of an identical design.



Abstract

The present invention relates to a method and a device for producing a toothbrush comprising a handle part and a brush head including a plurality of tufts of bristles. In the method of the invention the plastified material is injected into a plurality of mold cavities configured in a joint tool for shaping structural parts with an identical geometry, wherein different components of the plastified material are supplied via separate channels to individual mold cavities for preparing different variants of one type of toothbrush in an efficient and inexpensive manner for ready-for-sale packaging. The device of the invention for producing a toothbrush of the above-mentioned type comprises a movable tool part and a stationary tool part that form a plurality of identical mold cavities. In the device of the invention, different plastifying units are assigned to individual mold cavities for efficiently and inexpensively preparing variants of one toothbrush type for ready-for-sale packaging.

Fig. 1

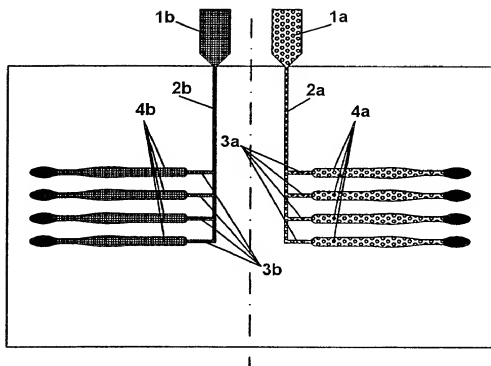
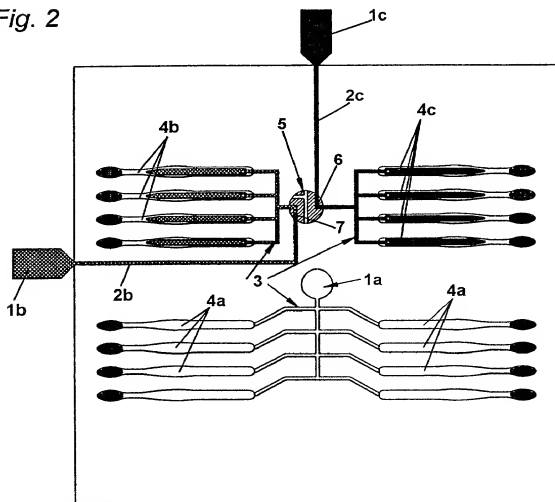


Fig. 2



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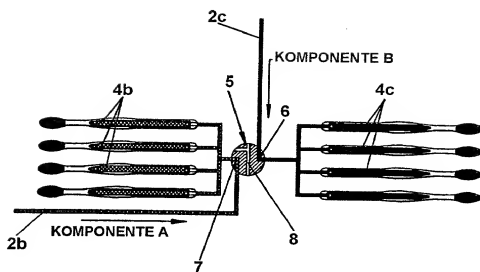


Fig. 3

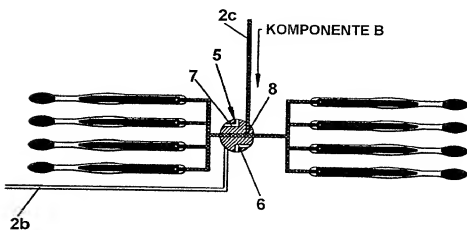


Fig. 4

P34410B-092/W1

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, past office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled Method and Device for Producing a Toothbrush, which is described and claimed in

- ☐ the attached specification.
☒ the specification in application 09/201,613, filed on November 28, 2000 and amended on _____ (if applicable).
☐ international (PCT) application No. _____ filed on _____ and as amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.
 I acknowledge the duty to disclose information which is known to be material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Claimed

(Number)	(Country)	(Day/Month/Year Filed)	[] Yes [] No
(Number)	(Country)	(Day/Month/Year Filed)	[] Yes [] No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is known to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Number)	(Filing Date)	(Status - Patented, Pending, Abandoned)
(Application Number)	(Filing Date)	(Status - Patented, Pending, Abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: James F. Boyle, Reg. No. 30,653; Timothy E. Newholm, Reg. No. 34,400; David D. Stein, Reg. No. 40,828; Michael J. Grava, Reg. No. 38,692; and Mary E. Eberle, Reg. No. 43,399.
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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